CLEANING TOOL AND METHOD OF MANUFACTURING CLEANING PART THEREOF

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a cleaning tool comprising a cleaning component and a handle component, and to a method for manufacturing a cleaning component for said cleaning tool.

Description of the Related Art

Dusters have been used in the past as cleaning tools for removing dust that builds up on chests and other such furniture; computers, lighting devices, and other such electrical products; and interior walls, thresholds and sills, and so forth. A duster is constructed such that a plurality of cord-like bands are attached to the distal end of a handle component, and the surface of a dusty object is hit with the cord-like bands to remove the dust. Therefore, a conventional duster had no wiping function, so it was unable to remove dust without scattering it into the air.

Proposals that have been made in order to help solve this drawback to dusters include a cleaning tool in which a cleaning cloth equipped with a wiping component and a dusting component is attached to the head at the distal end of a handle component (Japanese Laid-Open Patent Application H10-43115), and a hand wiper comprising a handle component, a head

component, and a cleaning cloth, with the main portion formed in the center of the head component, and a thin flexible portion formed around the main portion (Japanese Laid-Open Patent Application 2000-83883).

However, with the cleaning tool described in Japanese Laid-Open Patent Application H10-43115, the wiping component did not offer sufficient wiping capability, and the tool was inconvenient to use. With the hand wiper described in Japanese Laid-Open Patent Application 2000-83883, not only was the wiping performance lacking, but narrow spaces could not be properly cleaned.

The present invention was conceived in order to solve the above problems, and it is an object thereof to provide a cleaning tool that exhibits adequate cleaning performance even in the cleaning of narrow crevices.

SUMMARY OF THE INVENTION

The present invention provides a cleaning tool comprising a cleaning component and a handle component, wherein the cleaning component is designed such that a sheet-like fiber bundle and a sheet are joined to produce a sheet laminate having a joining portion, this sheet laminate is bent along the joining portion to form a bulky component formation portion, the sheet laminate in which said bulky component formation portion has been formed is bent so that bulky component formation portions are across from each other, and

integrated such that the contact surfaces of the opposing sheet-like fiber bundles are joined together, and support rods of the handle component are inserted into a handle insertion component having handle insertion openings made at one end of the bulky component formation portions and formed inside the bulky component formation portion.

The cleaning tool of the present invention is constituted such that the sheet laminate is bent and the contact surfaces of the opposing sheet-like fiber bundles are partially joined together to form a bulky component formation portion, and the sheet laminate in which said bulky component formation portion has been formed is bent and the contact surfaces of the opposing sheet-like fiber bundles are joined, forming in a bulky form the bulky portion handle insertion openings made at one end and the handle insertion component in the bulky component formation portion. Accordingly, this cleaning tool can be made in a slender shape, which means that dust and dirt in narrow crevices can be efficiently wiped clean. Also, since a sheet-like fiber bundle produced by bundling fibers is used for the cleaning component in this cleaning tool, even if dust is hiding in narrow grooves in a tight space, the fibers that make up the sheet-like fiber bundle can reach into these narrow grooves and efficiently clean out any dust hiding in these grooves, affording excellent dusting performance.

Also, with this cleaning tool, the handle insertion component is formed by bending the sheet laminate, so there is

no need to separately produce and install any parts that would serve as the handle insertion component, which means that fewer parts make up the cleaning tool.

The present invention provides a cleaning tool comprising a cleaning component and a handle component, wherein the cleaning component is designed such that a sheet-like fiber bundle and a sheet having a strip component are partially joined to produce a sheet laminate having a joining portion, this sheet laminate is bent along the joining portion to form a bulky component formation portion, the sheet laminate in which said bulky component formation portion has been formed is bent so that bulky component formation portions are across from each other, with the sheet-like fiber bundle on the inside, and integrated such that the contact surfaces of the sheet-like fiber bundles are joined together, and support rods of the handle component are inserted into a handle insertion component having handle insertion openings made at one end of the bulky component formation portions and formed inside the bulky component formation portion.

With this cleaning tool, in addition to the above-mentioned effects of being formed in a slender shape and being able to efficiently remove dust and dirt from narrow crevices, and of reducing the number of parts required, larger dust particles that cannot be wiped away with just the fibers that make up the sheet-like fiber bundle can be wiped away with the

strip component provided to the sheet, resulting in even better cleaning performance.

With the cleaning tool of the present invention, the sheet-like fiber bundle may be formed by layering a plurality of sheet-like fiber bundles.

With this cleaning tool, because a plurality of layered sheet-like fiber bundles are used as the sheet-like fiber bundle, more fibers are involved in cleaning and wipe away dust more efficiently.

With the cleaning tool of the present invention, the sheet-like fiber bundle may comprise a first sheet-like fiber bundle composed of numerous fibers and a second sheet-like fiber bundle composed of fibers thicker than the fibers that make up the first sheet-like fiber bundle.

With this cleaning tool, the sheet-like fiber bundle comprises a first sheet-like fiber bundle and a second sheet-like fiber bundle composed of fibers thicker than the fibers that make up the first sheet-like fiber bundle, and the stiffness of the first sheet-like fiber bundle can be made different from that of the second sheet-like fiber bundle. Specifically, if the fibers that make up a sheet-like fiber bundle are thicker, the stiffness will be higher, so the second sheet-like fiber bundle can be made stiffer. Also, the thinner are the fibers that make up the sheet-like fiber bundle, the more slender will be the fiber bundle when the fibers are made into a sheet-like fiber bundle. Because of

this, with this cleaning tool, dust can be efficiently wiped away with the stiffer second sheet-like fiber bundle, while this dust that has been wiped off can be efficiently picked up by the finer first sheet-like fiber bundle, which means that more efficient cleaning is possible.

With the cleaning tool of the present invention, the sheet-like fiber bundle may be constituted such that a first sheet-like fiber bundle composed of numerous fibers and a second sheet-like fiber bundle composed of fibers that are thicker and shorter than the fibers that make up the first sheet-like fiber bundle are partially joined.

When the fibers that make up a sheet-like fiber bundle are shorter, these fibers become stiffer, which means that the second sheet-like fiber bundle can be made even stiffer.

Therefore, with this cleaning tool, since the fibers that make up the second sheet-like fiber bundle are thicker and shorter than the fibers that make up the first sheet-like fiber bundle, they are stiffer, and these stiffer fibers more powerfully wipe away dust from narrow crevices, and the dust that is thus wiped off is picked up by the finer fibers, which affords even more effective cleaning and also helps prevent the thick fibers from becoming entangled with the fine fibers.

With the cleaning tool of the present invention, the cleaning component may be produced by interposing a fiber bundle body composed of a first sheet-like fiber bundle and/or a second sheet-like fiber bundle between sheet-like fiber

bodies that face each other when a sheet laminate is bent, and joining the fiber bundle body and the sheet-like fiber bundle where they are in contact with each other.

This cleaning tool can be constituted such that the distal ends of the fibers that make up the fiber bundle body are above the upper end of the bulky component. Therefore, with this cleaning tool, any dust or the like that is above the bulky component can be efficiently wiped away with the fiber bundle body.

With the cleaning tool of the present invention, the sheet laminate may be produced by sandwiching the sheet-like fiber bundle with the sheet, and joining the sheet body to the sheet-like fiber bundle so as to cover the surface on the opposite side at the location of the joining portion.

With this cleaning tool, since the sheet-like fiber bundle is sandwiched by the sheet and the sheet body, the overall configuration of the sheet-like fiber bundle is stabilized, giving the cleaning tool better integrity overall.

With the cleaning tool of the present invention, the sheet-like fiber bundle may comprise a plurality of first sheet-like fiber bundles and/or a plurality of second sheet-like fiber bundles.

With this cleaning tool, the use of a plurality of sheet-like fiber bundles allows dust to be wiped away more efficiently by a greater number of fibers.

With the cleaning tool of the present invention, the sheet-like fiber bundle may be produced by alternately laminating first sheet-like fiber bundles and second sheet-like fiber bundles.

With this cleaning tool, the sheet-like fiber bundles are such that dust is efficiently wiped away by the thicker, stiffer fibers that make up the second sheet-like fiber bundle, while the dust that has been wiped off is picked up by the finer fibers that make up the first sheet-like fiber bundle, so the cleaning component is able to clean more effectively. Also, these sheet-like fiber bundles effectively contribute to preventing the entanglement of the thick fibers with the fine fibers.

With the cleaning tool of the present invention, the sheet may be composed of a nonwoven cloth.

With this cleaning tool, if the sheet has a strip component, fine dust can be efficiently picked up by the fibers of the nonwoven cloth that makes up the strip component. Also, with this cleaning tool, the sheet-like fiber bundle is disposed to the inside of where the strip component of the sheet is disposed, fine dust is wiped away by the fibers that make up the sheet-like fiber bundle, and this dust that has been wiped off can be efficiently picked up by the fibers of the nonwoven cloth that makes up the strip component.

The present invention also provides a method for manufacturing a cleaning component for a cleaning tool,

wherein a sheet-like fiber bundle produced by bundling fibers in the form of a sheet is laminated with a sheet having a strip component, these are partially joined to form a sheet laminate, and the sheet laminate is then bent along its joining portion so that the sheet-like fiber bundle is bent double at the joining portion, thereby producing a bulky component formation portion, after which the sheet having the strip component is bent back toward the sheet-like fiber bundle on the opposite side so as to surround the bulky component formation portion, and further the bulky component formation portion is bent so that the sheet-like fiber bundle side is on the inside, and the sheet-like fiber bundle and the sheet having the strip component are joined and integrated so that the contact surfaces of the sheet-like fiber bundles are joined to each other.

The method for manufacturing a cleaning component of the present invention makes it easy to provide a cleaning tool that provides sufficient cleaning performance even in the cleaning of narrow crevices.

Further, the present invention provides a method for manufacturing a cleaning component for a cleaning tool, comprising the steps of making notches for forming a strip in a long sheet used for forming a sheet having a strip component; forming a joining portion by joining, in the sheet width direction of the sheet, a long laminate sheet obtained by laminating a long sheet that has been notched for forming a

strip, first with a long sheet-like fiber bundle produced by bundling fibers in the form of a sheet, and then with a substrate sheet for supporting the sheet-like fiber bundle; obtaining a laminated sheet for forming a cleaning component, by slitting the long sheet laminate between the joining portions; forming a bulky component formation portion by cutting out one of the side portions flanking the joining portion of the sheet having a strip component in the laminated sheet for forming a cleaning component, cutting out both side portions flanking the joining portions of the substrate sheet, and then bending along the joining portions so that sheet-like fiber bundle is folded double, and joining so that the joining portions are tubular in shape; and forming handle insertion openings at one end of the bulky component formation portion by bending the laminated sheet for forming a cleaning component in which the bulky component formation portion has been formed, so that the sheet-like fiber bundles are on the inside, and integrating so that the contact surfaces of the sheet-like fiber bundles are joined to each other.

The method for manufacturing a cleaning component of the present invention makes it easy to provide a cleaning tool that provides sufficient cleaning performance even in the cleaning of narrow crevices, and when the cleaning tool is equipped with a sheet having a strip component, the handle insertion component can be kept in a bulky form and the periphery of the handle insertion component can be surrounded

by the sheet-like fiber bundle, allowing a stouter handle insertion component to be formed.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded oblique view of an example of the cleaning tool of the present invention;

Fig. 2 is an oblique view of a sheet laminate in the process of manufacturing the cleaning tool of the present invention;

Fig. 3 is a cross section along the I-I line in Fig. 2;

Fig. 4 is an oblique view of a sheet laminate in the process of manufacturing the cleaning tool of the present invention;

Fig. 5 is an oblique view of a sheet laminate in the process of manufacturing the cleaning tool of the present invention;

Fig. 6 is an oblique view of another example of the cleaning tool of the present invention;

Fig. 7 is an exploded oblique view of an example of the cleaning tool of the present invention;

Fig. 8 is a vertical cross section along the II-II line in Fig. 7;

Fig. 9 is an oblique view of a step in the method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 10 is an oblique view of another step in the method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 11 is an oblique view of another step in the method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 12 is an oblique view of another step in the method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 13 is an oblique view of another step in the method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 14 is a process schematic of another method for manufacturing a cleaning component of the cleaning tool of the present invention;

Fig. 15A is a view along the A arrow in Fig. 14;

Fig. 15B is a view along the B arrow in Fig. 14;

Fig. 15C is a view along the C arrow in Fig. 14;

Fig. 16 is a vertical cross section along the X-X line in Fig. 15B;

Fig. 17 is a vertical cross section along the XI-XI line in Fig. 15C;

Fig. 18 is a vertical cross section illustrating the state when one side of the nonwoven cloth flanking the joining portion, and both sides of the substrate sheet flanking the joining portion are cut out alone perforated lines from the

laminated sheet for forming the cleaning component shown in Fig. 17;

Fig. 19 is an oblique view of the state when the laminated sheet for forming the cleaning component shown in Fig. 18 is bend along the joining portion;

Fig. 20 is a vertical cross section illustrating the state when joining has been performed so as to form a bulky tubular handle insertion component at the joining portion of the laminated sheet for forming a bent cleaning component as shown in Fig. 19;

Fig. 21 is an oblique view of the state when the laminated sheet for forming a cleaning component in which a handle insertion component has been formed as shown in Fig. 20 is bent;

Fig. 22A is a front view of an embodiment of the handle component of the cleaning tool of the present invention;

Fig. 22B is a plan view of an embodiment of the handle component of the cleaning tool of the present invention;

Fig. 23 is a front view of the handle component when folded;

Fig. 24A is a vertical cross section of the bending mechanism of the handle component;

Fig. 24B is a vertical cross section of along the D-D line in Fig. 22A;

Fig. 25A is a plan view of an embodiment illustrating another example of the handle component;

Fig. 25B is a plan view of the state when the grip component of the handle component in Fig. 25A is extended;

Fig. 26A is a vertical cross section of along the E-E line in Fig. 25A;

Fig. 26B is a vertical cross section illustrating the state when the protrusion in Fig. 26A is pushed in;

Fig. 27A is a main component side view of the joining portion between a support rod and the grip component of the handle component in Fig. 25A;

Fig. 27B is a main component side view of the state when a stopper of the grip component in Fig. 27A has been moved;

Fig. 28A is a main component vertical cross section of the vicinity of the stopper in Fig. 27A;

Fig. 28B is a main component vertical cross section of the vicinity of the stopper in Fig. 27B;

Fig. 29A is a main component vertical cross section of the vicinity of the joining portion in Fig. 27A; and

Fig. 29B is a main component vertical cross section of the vicinity of the joining portion in Fig. 27B

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The cleaning tool of the present invention comprises a cleaning component and a handle component, wherein the cleaning component is designed such that a sheet-like fiber bundle and a sheet are joined to produce a sheet laminate in which a joining portion is formed, this sheet laminate is bent along the joining portion to form a bulky component formation

portion, the sheet laminate in which said bulky component formation portion has been formed is bent so that bulky component formation portions are across from each other, and integrated such that the contact surfaces of the opposing sheet-like fiber bundles are joined together, and support rods of the handle component are inserted into a handle insertion component formed inside the bulky component formation portion and having handle insertion openings made at one end of the bulky component formation portions.

Examples of the sheet used in the cleaning component include paper, synthetic resin sheets, and nonwoven cloth, but nonwoven cloth is preferred. This nonwoven cloth can be spunlace nonwoven cloth, spunbond nonwoven cloth, thermal bond nonwoven cloth, air-through nonwoven cloth, point-bonded nonwoven cloth, or the like, but spunbond nonwoven cloth and thermal bond nonwoven cloth are preferred. Examples of the fibers that make up the nonwoven cloth include natural fibers, synthetic fibers, and composite fibers, but synthetic fibers and composite fibers are preferred because of their thermal fusibility. The nonwoven cloth preferably has a basis weight of about 20 to 100 g/m^2. Even if the sheet is composed of a material that is not thermally fusible, the sheet and the sheet-like fiber bundle can be joined by thermal fusion by laminating a thermally bondable material such as a hot melt adhesive. The sheet is not limited to a single sheet, and can consist of two or more sheets.

The sheet-like fiber bundle is produced by bundling fibers in the form of a sheet, and this can comprise numerous fibers unified enough that the individual fibers will not come apart, although the fibers may be partially bonded together by fusion or the like if necessary. The sheet-like fiber bundle can be obtained, for example, by a method in which numerous long fibers are bundled in the form of sheets, these products are joined perpendicular to the lengthwise direction at suitable intervals, and this product is then cut in the middle of adjacent joining portions.

Examples of the fibers that make up the sheet-like fiber bundle include cotton, wool, and other natural fibers, polyethylene, polypropylene, polyethylene terephthalate, nylon, polyacrylic, and other such synthetic fibers, and core/sheath fibers, islands-in-the-sea fibers, side-by-side fibers, and other such composite fibers, but synthetic fibers and composite fibers are preferred because of their thermal fusibility, and core/sheath fibers in which the core is polypropylene and the sheath is polyethylene are particularly favorable because they combine the excellent thermal fusibility of the polyethylene that makes up the sheath with the good stiffness of the polypropylene that makes up the core.

The fibers that make up the sheet-like fiber bundle have a thickness of about 0.01 to 0.3 mm. A sheet-like fiber bundle 7 may be made up solely of fibers of the same thickness, or made up of fibers of two or more different thicknesses, and

may made up solely of fibers of the same type, or made up of fibers of two or more different types.

The sheet-like fiber bundle can be made up of fibers of different colors, regardless of whether the thickness and type of the constituent fibers are the same or different.

It is also possible to laminate two or more sheet-like fiber bundles.

When two or more sheet-like fiber bundles are laminated, sheet-like fiber bundles of different thickness and of different fiber colors and types can be combined as desired. Using sheet-like fiber bundles of different colors together improves the designability of the cleaning tool of the present invention. When a plurality of sheet-like fiber bundles having different fiber thicknesses, types of fibers, colors, etc., are used together, there are no particular restrictions on the number of laminations, but the number is usually from two to ten.

When a plurality of sheet-like fiber bundles are laminated for use in a cleaning tool, the sheet-like fiber bundles of the cleaning tool of the present invention may be constituted such that a first sheet-like fiber bundle composed of numerous fibers and a second sheet-like fiber bundle composed of fibers that are thicker and shorter than the fibers that make up the first sheet-like fiber bundle are partially joined.

This cleaning tool will now be described in detail through reference to the drawings.

Fig. 1 is an exploded oblique view of an example of the cleaning tool of the present invention, which comprises a cleaning component 1 and a handle component 2.

The handle component 2 has a grip component 14 and support rods 5. The cleaning component 1 and the handle component 2 are integrated by inserting the support rods 5 of the handle component 2 into handle insertion components 6 formed at the location of a bulky component formation portion 3, through handle insertion openings 4 made at one end of the bulky component formation portion 3 of the cleaning component 1. In Fig. 1, 45 is an anti-slip protrusion for preventing the support rods 5 from coming loose from the handle insertion components 6.

The cleaning component 1 is constituted by the sheet-like fiber bundle 7 and a sheet 9.

As shown in Fig. 5, the sheet-like fiber bundle 7 of the cleaning component 1 comprises a first sheet-like fiber bundle 7a produced by collecting fibers in the form of a sheet, and a second sheet-like fiber bundle 7b produced by collecting in the form of a sheet fibers that are thicker (have a larger size) than the fibers that make up the first sheet-like fiber bundle 7a. As a result, dust is wiped away by the thicker, stiffer fibers, and the dust that has been wiped off is picked up by the finer fibers, which affords more effective cleaning.

The thickness of the fibers that make up the first sheet-like fiber bundle is preferably a diameter of 10 to 50 μm. The thickness of the fibers that make up the second sheet-like fiber bundle is greater than the thickness of the fibers that make up the first sheet-like fiber bundle, but it is preferable for the diameter to be from 60 to 300 μm because then the second sheet-like fiber bundle 7b will be suitably stiffer than the first sheet-like fiber bundle 7a.

With this cleaning tool, the first sheet-like fiber bundle 7a and the second sheet-like fiber bundle 7b are constituted such that the fibers that make up the second sheet-like fiber bundle 7b are shorter than the fibers that make up the first sheet-like fiber bundle 7a.

The length of the fibers that make up the second sheet-like fiber bundle 7b is less than the length of the fibers that make up the first sheet-like fiber bundle 7a, and it is preferable for them to be about 1 to 10 mm shorter than the fibers that make up the first sheet-like fiber bundle 7a.

When the sheet-like fiber bundle 7 comprises first sheet-like fiber bundles alternately laminated with second sheet-like fiber bundles, the sheet-like fiber bundle 7 functions such that dust is efficiently wiped away by the thicker, stiffer fibers that make up the second sheet-like fiber bundle 7b, while the dust that has been wiped off is picked up by the finer fibers that make up the first sheet-like fiber bundle 7a, so the cleaning component 1 is able to clean more effectively.

Also, a sheet-like fiber bundle 7 such as this is preferable because it helps prevent the thick fibers from becoming entangled with the fine fibers.

Examples of the fibers that make up the first sheet-like fiber bundle 7a include the same as those listed above for the sheet-like fiber bundle, namely, cotton, wool, and other natural fibers, polyethylene, polypropylene, polyethylene terephthalate, nylon, polyacrylic, and other such synthetic fibers, and core/sheath fibers, islands-in-the-sea fibers, side-by-side fibers, and other such composite fibers, but synthetic fibers and composite fibers are preferred because of their thermal fusibility, and core/sheath fibers in which the core is polypropylene and the sheath is polyethylene are particularly favorable because they combine the excellent thermal fusibility of the polyethylene that makes up the sheath with the good stiffness of the polypropylene that makes up the core. The fibers that make up the second sheet-like fiber bundle 7b can be polypropylene, polyethylene terephthalate, PBT, or other such thermoplastic fibers, for example. The first sheet-like fiber bundle 7a and the second sheet-like fiber bundle 7b may be made up solely of the same type of fibers, or made up of fibers of two or more different types, and may made up of fibers of different colors, regardless of whether the constituent fibers are of the same or different types and thicknesses. Also, two or more of the

first sheet-like fiber bundles 7a may be laminated with two or more second sheet-like fiber bundles 7b.

With the cleaning component 1, a joining portion 10 is formed in the region where the sheet-like fiber bundle 7 and the sheet 9 overlap in the sheet laminate formed by laminating the sheet-like fiber bundle 7 and the sheet 9. This sheet laminate is bent with the sheet 9 to the inside (Fig. 4), forming the bulky component formation portion 3 with the sheet-like fiber bundles 7 facing each other along the joining portion 10. The sheet laminate in which the bulky component formation portion 3 has been formed is then bent such that one end in the lengthwise direction moves toward the other end, and the contact surfaces of the sheet-like fiber bundles 7 that face each other as a result of this bending are joined in the vicinity of the bulky component formation portion 3, forming a joining portion 11 and integrating the whole (Fig. 5).

The cleaning component 1 of this cleaning tool can be manufactured as follows.

As shown in Figs. 2 and 3, the sheet-like fiber bundle 7 and the sheet 9 are laminated and joined at the location of a portion 12 where the two overlap (for the sake of clarity, the area of the portion 12 where the sheet-like fiber bundle 7 and the sheet 9 are joined is shaded). Examples of joining methods include thermal fusion, adhesive bonding, and stitching, but the sheet-like fiber bundle 7 and the sheet 9

are preferably made of thermally fusible materials because the joining can be accomplished by thermal fusion since it allows joining and integration to be performed easily by heating and pressing with a heated roller or the like. (The following description assumes the sheet-like fiber bundle 7 and the sheet 9 to be made from thermally fusible materials.) The portion 12 where the sheet-like fiber bundle 7 and the sheet 9 are joined is formed where the middle part of the sheet-like fiber bundle 7 is sandwiched perpendicular to the fiber direction of the sheet-like fiber bundle 7. As shown in Fig. 3, the sheet-like fiber bundle 7 and the sheet 9 are put together and joined at the portion 12 to constitute a sheet laminate 13a in which the joining portion 10 is formed. The sheet laminate 13a in which the joining portion 10 is formed is bent with the sheet 9 to the inside, forming the bulky component formation portion 3 in the direction in which the joining portion 10 was formed (Fig. 4).

Next, one end in the lengthwise direction of the resulting sheet laminate 13b is bent toward the other end to form a sheet laminate 13c, and the sheet-like fiber bundles 7 that face each other as a result of this bending are joined where they come into contact with each other, thereby forming a joining portion 11 and obtaining the cleaning component 1. In this case, it is preferable for the sheet-like fiber bundles 7 that face each other to be joined together in the vicinity of the bulky component formation portion 3 (Fig. 5).

If thermal fusion is employed for this purpose, not only can the opposing sheet-like fiber bundles 7 be joined, but the sheet-like fiber bundle 7 and the sheet 9 can also be joined at the same time.

Also, the cleaning component 1 of the cleaning tool of the present invention may be constituted such that when the sheet laminate 13c is formed by bending one end in the lengthwise direction of the sheet laminate 13b toward the other end, a fiber bundle body 70 produced by laminating the first sheet-like fiber bundle 7a and the second sheet-like fiber bundle 7b is interposed between the sheet-like fiber bundles 7 that face each other as a result of this bending, so that the distal end in at least one fiber direction of the fiber bundle body 70 is disposed above the bulky component formation portion 3 (Fig. 6). In this case, since the cleaning component 1 is constituted such that the distal ends in the fiber direction of the first sheet-like fiber bundle and second sheet-like fiber bundle face both above and below the bulky component formation portion 3, the cleaning tool is able to trap dirt and dust with the sheet-like fiber bundle 7 and, at the same time, trap dirt and dust above the bulky component formation portion 3 with the fiber bundle body 70.

There are no limitations on the number of laminations of the first sheet-like fiber bundle 7a and the second sheet-like fiber bundle 7b in the fiber bundle body 70. If the fiber bundle body 70 is produced by laminating numerous first sheet-

like fiber bundles 7a and second sheet-like fiber bundles 7b, the cleaning tool will be able to form a state in which many of the constituent fibers of the first sheet-like fiber bundle 7a or the second sheet-like fiber bundle 7b are higher than the bulky component formation portion 3, allowing dirt and dust that is higher than the bulky component formation portion 3 to be trapped more efficiently.

Also, it is preferable for the fiber bundle body 70 to be constituted by alternately laminating the first sheet-like fiber bundles 7a with the second sheet-like fiber bundles 7b because, as discussed above, the sheet-like fiber bundle 7 will function such that dust is efficiently wiped away by the thicker, stiffer fibers that make up the second sheet-like fiber bundle 7b, while the dust that has been wiped off is picked up by the finer fibers that make up the first sheet-like fiber bundle 7a, so the cleaning component 1 is able to clean more effectively.

The cleaning component 1 of the cleaning tool of the present invention may also be constituted such that a sheet body is laminated on the outside of the sheet-like fiber bundle 7. In this case, the cleaning component 1 can be manufactured by laying out the sheet body so that the sheet-like fiber bundle 7 is sandwiched by the sheet body and the sheet 9, forming the sheet laminate 13a, and bending the sheet laminate 13a in the same manner as discussed above. The sheet body is preferably a nonwoven cloth. In this case, the sheet

body, the sheet-like fiber bundle 7, and the sheet 9 can be easily joined and integrated by thermal fusion, thereby forming the sheet laminate 13a.

This cleaning component 1 can be such that the sheet-like fiber bundle 7 is sandwiched by the sheet body and the sheet 9, which stabilizes the overall configuration of the sheet-like fiber bundle 7 and holds the cleaning tool together better overall.

The cleaning component of the cleaning tool of the present invention may make use of a sheet that is equipped with a strip component on one side.

The cleaning tool of the present invention in the above case will now be described in detail through reference to the drawings.

The cleaning tool here is constituted as shown in Fig. 7.

Fig. 7 is an exploded oblique view of another example of the cleaning tool of the present invention.

This cleaning tool comprises the cleaning component 1 equipped with the sheet-like fiber bundle 7 and the sheet 9, and the handle component 2 having the grip component 14 and the support rods 5. The cleaning component 1 and the handle component 2 are constituted such that they can be integrated by inserting the support rods 5 of the handle component 2 into handle insertion components 6 formed at the location of the bulky component formation portion 3, through the handle insertion openings 4 made at one end of the bulky component

formation portion 3 of the cleaning component 1. In Fig. 7, 45 is an anti-slip protrusion for preventing the support rods 5 from coming loose from the handle insertion components 6.

The cleaning component 1 of this cleaning tool is such that the sheet-like fiber bundle 7 and the sheet 9 having a strip component 8 are partially joined at the joining portion 10, producing a sheet laminate in which the joining portion 10 is the bulky component formation portion 3, this sheet laminate is bent so that the sheet-like fiber bundle 7 side is to the inside, and the joining portion 11 is provided and integrated in the vicinity of the bulky component formation portion 3 of the opposing sheet-like fiber bundles 7.

With this cleaning tool, the sheet-like fiber bundle 7 may be formed by layering a plurality of sheet-like fiber bundles. In this case, the sheet-like fiber bundle 7 may be constituted as above, comprising a first sheet-like fiber bundle 7a composed of numerous fibers and a second sheet-like fiber bundle 7b composed of fibers thicker (fibers that are larger in size) than the fibers that make up the first sheet-like fiber bundle 7a. Also, as discussed above, the thickness of the fibers that make up the first sheet-like fiber bundle is preferably a diameter of 10 to 50 μm, and the thickness of the fibers that make up the second sheet-like fiber bundle is greater than the thickness of the fibers that make up the first sheet-like fiber bundle, and preferably the diameter is from 60 to 300 μm. The sheet-like fiber bundle 7 may also be

constituted by alternately laminating the first sheet-like fiber bundles and the second sheet-like fiber bundles. In this case, the sheet-like fiber bundle 7 will function such that dust is efficiently wiped away by the thicker, stiffer fibers that make up the second sheet-like fiber bundle 7b, while the dust that has been wiped off is picked up by the finer fibers that make up the first sheet-like fiber bundle 7a, so the cleaning component 1 is able to clean more effectively. This is also preferable because it will help prevent the thick fibers from becoming entangled with the fine fibers.

With the cleaning component 1 of this cleaning tool, the strip component 8 of the sheet 9 is preferably about 20 to 100 mm long and about 0.5 to 5 mm wide.

The sheet 9 having the strip component 8 is not limited to a single sheet, and two or more sheets can be laminated. When a plurality of the sheets 9 having the strip component 8 are laminated together, all the sheets do not have to be the same, and sheets 9 of different materials, colors, and so forth can be used together. There are no particular restrictions on how many of the sheets 9 are laminated, but the number is usually from two to five.

A method for manufacturing the cleaning component 1 of this cleaning tool will now be described.

As shown in Fig. 9, the sheet-like fiber bundle 7 is laminated with the sheet 9 having the strip component 8 on one side, and these are joined at the portion 12 where the two

overlap (for the sake of clarity, the area of the portion 12 where the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8 are joined is shaded). Examples of joining methods include thermal fusion, adhesive bonding, and stitching, but when the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8 are preferably made of thermally fusible materials because the joining can be accomplished by thermal fusion since it allows joining and integration to be performed easily by heating and pressing with a heated roller or the like. The portion 12 where the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8 are joined corresponds to the portion where the middle part of the sheet-like fiber bundle 7 is sandwiched perpendicular to the fiber direction of the sheet-like fiber bundle 7. Next, as shown in Fig. 10, the sheet laminate 13a joined at the portion 12, which is part of the overlapping component between the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8, is bent in the vicinity of the middle perpendicular to the fiber direction of the sheet-like fiber bundle 7, so that the sheet-like fiber bundles 7 face each other and are joined at the portion 12 of the overlapping component, forming the sheet laminate 13b in which the joining portion 10 serves as the bulky component formation portion 3.

Next, as shown in Fig. 11, the sheet 9 having the strip component 8 in the sheet laminate 13b in which the bulky component formation portion 3 has been formed is bent in the

direction of the bulky component formation portion 3, and the bulky component formation portion 3 of the sheet 9 is joined with the contact portions. When thermal fusion is employed for this purpose, the inner sides of the bulky component formation portion 3 in the sheet-like fiber bundle 7 can also be joined at the same time. After the joining of the sheet 9 with the contact portions of the bulky component formation portion 3, as shown in Fig. 12, the sheet 9 is bent back so as to envelop the bulky component formation portion 3, forming the sheet laminate 13c. This sheet laminate 13c is bent so that the sheet-like fiber bundle 7 side is to the inside (Fig. 13), and the cleaning component 1 is obtained by integrally joining the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8 so that the contact surfaces of the bent sheet-like fiber bundle 7 are joined. It is preferable for the joining to be performed such that the contact surfaces of the sheet-like fiber bundle 7 are joined very close to the bulky component formation portion 3. If thermal fusion is employed for this purpose, the sheet-like fiber bundle 7 and the sheet 9 having the strip component 8 can be joined at the same time between sheet-like fiber bundles 7.

Another method for manufacturing the cleaning component 1 of this cleaning tool will now be described. Fig. 14 illustrates another step of producing the cleaning component 1, and describes an example of forming a sheet having the strip component from a three-layer laminated unwoven cloth.

In Fig. 14, 47a, 47b, and 47c are long rolls of nonwoven cloth, 48 is a long sheet-like fiber bundle, and 49 is a long substrate sheet for supporting the sheet-like fiber bundle. There are no particular restrictions on the material of the substrate sheet 49 as long as it is in the form of a sheet, but a nonwoven cloth is preferred. The nonwoven cloths 47a, 47b, and 47c are played out while being layered over one another, and a cutter roll 50 makes a plurality of cuts 52, for forming a strip component in the lengthwise direction, in the resulting laminate 51 of the nonwoven cloths 47a to 47c (Fig. 15A). A plurality of blades are provided around the peripheral surface of the cutter roll 50 for making the cuts 52, and if gaps are provided to the blades, then non-continuous cuts 52 can be formed in the nonwoven cloth laminate 51 as shown in Fig. 15A. Providing non-continuous cuts 52 maintains the sheet form of the nonwoven cloth laminate 51. The nonwoven cloth laminate 51 is then laminated with the sheet-like fiber bundle 48 and the substrate sheet 49 to form a sheet laminate 53, but it is preferable for perforations 55 to be formed in the nonwoven cloth laminate 51 as shown in Fig. 15B with a perforating roller 54 prior to the formation of the sheet laminate 53. It is also preferable to provide perforations 57 (Fig. 17) in the substrate sheet 49 with a perforating roller 56 prior to the formation of the sheet laminate 53.

Next, the nonwoven cloths 47a to 47c, the sheet-like fiber bundle 48, and the substrate sheet 49 that make up the sheet laminate 53 are joined in the width direction, and joining portions 58 are intermittently provided in the lengthwise direction of the sheet laminate 53 a shown in Fig. 15B. When non-continuous cuts 52 are formed in the nonwoven cloth laminate 51 as shown in Fig. 15A, the joining portions 58 are preferably provided to the non-cut portions 60. The joining portions 58 are preferably formed by a heat sealing method involving heating and pressing with a sealing roll 59. The perforations 55 provided to the nonwoven cloth laminate 51 are preferably provided so as to be located to one side of the joining portions 58 in the non-cut portions 60 toward the cuts 52. The perforations 57 provided to the substrate sheet 49 are preferably formed so as to be located at both sides flanking the joining portions 58. If the width of the sheet-like fiber bundle 48 constituting the sheet laminate 53 is less than the width of the nonwoven cloths 47a to 47c and the substrate sheet 49, as shown in Fig. 16, the ends of the sheet-like fiber bundle 48 will not be exposed at the joining portion ends 58a, which is preferable because it facilitates the work of inserting the support rods of the handle component (discussed below) in the handle insertion components 6 formed by putting the joining portions 58 in the form of bulky tubes.

The sheet laminate 53 in which the joining portions 58 have been formed is cut between the joining portions 58 with a

cutting roll 61 as shown in Fig. 15C, forming a laminated sheet 62 for forming a cleaning component (Fig. 17). Next, as shown in Fig. 18, one of the side portions flanking the joining portion 58 of the nonwoven cloths 47a to 47c of the sheet in the laminated sheet 62 for forming a cleaning component is cut out from the perforations 55, and both side portions flanking the joining portion 58 of the substrate sheet 49 are cut out from the perforations 57. 49a in Fig. 18 is the remainder of the cut substrate sheet 49.

The cleaning component formation-use laminated sheet 62 obtained by cutting out one of the side portions flanking the joining portion 58 of the nonwoven cloths 47a to 47c and both side portions flanking the joining portion 58 of the substrate sheet 49 is then bent along the joining portion 58 so that the sheet-like fiber bundle 48 is folded over itself as shown in Fig. 19, and then the joining portion 58 is joined so as to become a bulky tubular component 63 as shown in Fig. 20, thereby forming the handle insertion component 6. After the handle insertion component 6 has been formed in this manner, as shown in Fig. 21, the cleaning component formation-use laminated sheet 62 is bent so that the sheet-like fiber bundle 48 side is on the inside, and the bent portions are joined together to obtain the cleaning component 1. This manufacturing method differs from the first manufacturing method described above in the order in which the handle insertion component 6 is formed in the manufacturing process,

but there is substantially no difference in the structure of the resulting cleaning component 1.

The second method described above was for a case in which three layers of nonwoven cloth 47a to 47c and one layer of sheet-like fiber bundle 48 were laminated, but there may instead be just one or two layers of nonwoven cloth, or four or more layers may be used, and two or more layers of the sheet-like fiber bundle 48 may also be used.

The cleaning tool of the present invention is obtained by attaching the handle component 2 to the cleaning component 1 by inserting the support rods 5 of the handle component 2 into the handle insertion components 6 of the cleaning component 1 manufactured as above. The cleaning component 1 is detachably attached to the handle component 2. The material of the handle component 2 can be plastic, metal, wood, etc., but plastic is preferred because of its light weight and low cost. When plastic is used as the material, a polyolefin resin, such as a polyethylene resin or polypropylene resin, is preferable because it is easy to mold.

Favorable examples of the handle component 2 will now be described through reference to the drawings from Figs. 22A and 22B to Figs. 29A and 29B. Figs. 22A and 22B to Figs. 24A and 24B are examples of a preferred embodiment of the handle component 2 of the cleaning tool of the present invention. The handle component 2 comprises the support rods 5 and the grip component 14. The support rods 5 provided to the handle

component 2 are preferably formed at a spacing that is slightly wider than the spacing between the handle insertion openings 4. With a constitution such as this, when the support rods 5 are inserted into the handle insertion components 6, the spacing between the support rods 5 is narrowed, and after their insertion into the handle insertion components 6, the restoring force of the support rods 5 creates an outward force, which holds the support rods 5 securely in the handle insertion components 6, so that the support rods 5 will not readily slip out of the handle insertion components 6 during cleaning. As shown in Figs. 22A and 22B, serration-like notches 15 are provided on the outsides of the two support rods 5. It is preferable for the notch angle α of the notches 15 on the support rod 5 side to be a large angle, and for the notch angle β of the notches 15 on the grip component 14 side also to be a large angle. Providing such notches 15 allows the two support rods 5 to be easily inserted into the handle insertion components 6, and also makes it less likely that the support rods 5 will come loose from the handle insertion components 6, and more effectively prevents the support rods 5 from slipping out of the handle insertion components 6 during cleaning.

The handle component 2 is constituted such that it can bend between the support rods 5 and the grip component 14, and so that the support rods 5 and the grip component 14 can both

be fixed when these have been extended. As shown in Figs. 24A and 24B, a receiver 16 is provided at the base of the support rods 5, an insertion component 17 is provided to the distal end of the grip component 14, a recess 18 in which the insertion component 17 can fit is provided in the interior of the receiver 16, bearing holes 21 are provided in side walls 19 and 20 inside the recess 18 formed in the receiver 16, and a shaft 24 provided to the side walls 22 and 23 of the insertion component 17 is supported in the bearing holes 21, which allows the grip component 14 to rotate. A latching protrusion 26 is provided to the ceiling 25 of the receiver 16, and a latching recess 28 in which the latching protrusion 26 can fit is provided to the upper surface 27 of the insertion component 17. The grip component 14 is rotated around the shaft 24 until the insertion component 17 goes into the recess 18, and the latching protrusion 26 inside the recess 18 fits into the latching recess 28 of the insertion component 17. This puts the grip component 14 and the support rods 5 in an extended state. When the grip component 14 is rotated in the opposite direction from the above, the latching protrusion 26 and the latching recess 28 are unlatched, allowing the grip component 14 and the support rods 5 to be folded up (Fig. 23).

The receiver 16 may instead be provided on the grip component 14 side, and the insertion component 17 provided on the support rod 5 side, and the latching protrusion 26 may be

provided on the insertion component 17 side, and the latching recess 28 provided on the receiver 16 side.

Figs. 25A and 25B illustrate another embodiment of the handle component 2 used in the cleaning tool of the present invention. With the handle component 2 in the embodiment shown in Fig. 25A, anti-slip protrusions 45 are provided instead of the notches 15 used in the above example, to prevent the support rods 5 from coming loose from the handle insertion components 6. This handle component 2 is constituted such that the two support rods 5 and the grip component 14 can be bent at a joining portion 29, and the grip component 14 can be extended. The grip component 14 of the handle component 2 shown in Figs. 25A and 25B comprises a hollow outer casing 46 and a core component 30 that is stowed in the hollow part of the outer casing 46. The core component 30 and the outer casing 46 are constituted such that they can slide in the lengthwise direction. The grip component 14 is extended and lengthened by sliding the outer casing 46 and the core component 30 in the lengthwise direction. A protrusion 31 is provided in the vicinity of the end of the core component 30 in the lengthwise direction, and fitting holes 32 and 33 in which the protrusion 31 fits are provided in the vicinity of both ends of the outer casing 46 in the lengthwise direction. As shown in Fig. 25A, when the grip component 14 has been retracted, the protrusion 31 of the core component 30 fits into the fitting hole 33 at the rear end side of the

outer casing 46. As shown in Fig. 25B, as the grip component 14 is extended, the protrusion 31 of the core component 30 is fitted and fixed in the fitting hole 32 at the distal end side of the outer casing 46. Fitting the protrusion 31 into the fitting holes 32 and 33 fixes the grip component 14 at a specific length. When the grip component 14 is pulled out, the engagement of the protrusion 31 in the fitting hole 32 prevents the grip component 14 from being pulled out too far, which would cause the core component 30 to come out of the outer casing 46. As shown in Fig. 26A, when the protrusion 31 of the core component 30 has been fitted into the fitting hole 32 (or 33) of the outer casing 46, the outer casing 46 is latched to the core component 30 so that it will not move readily. The portion of the end of the core component 30 where the protrusion 31 is provided is formed thin as shown in Fig. 26B, and when the grip component 14 is extended and retracted, the protrusion 31 can be easily pushed into the hollow part of the outer casing 46, and the protrusion 31 unlatched from the fitting hole 32 (or 33), by pressing on the protrusion 31 with a finger, allowing the core component 30 and the outer casing 46 to be slid relative to each other.

The handle component 2 shown in Figs. 25A and 25B is formed so that it can fold in two at the joining portion 29 between the grip component 14 and the support rods 5, and is provided with an anti-folding mechanism so that during use these components will be kept extended and not readily fold up.

As shown in Figs. 27A and 27B, the anti-folding mechanism comprises a stopper 34 formed slidably in the lengthwise direction of the core component 30, and a latching tab 37 extending from a side wall 36 of the joining portion 29 of the support rods 5. The handle component 2 is prevented from folding up during use by latching the latching tab 37 onto the stopper 34. As shown in Fig. 27A, when the stopper 34 has been slid in the lengthwise direction of the core component 30 and pressed against the joining portion 29, the grip component 14 can be non-rotatably fixed with the grip component 14 and the support rods 5 in an extended state by latching the latching tab 37 on the stopper 34. In contrast, as shown in Fig. 27B, when the stopper 34 is slid toward the grip component 14, the latching tab 37 is unlatched from the stopper 34, allowing the grip component 14 to rotate around the rotational axis 38 of the joining portion 29. The grip component 14 can be rotated about 180° and folded into a compact size. A movement positioning mechanism is formed on the stopper 34 so that the stopper 34 will not move more than necessary when slid in the direction of being unlatched from the latching tab 37. This movement positioning mechanism, as shown in Figs. 28A and 28B, for example, can be constituted such that a protrusion 39 is provided to the upper surface of the core component 30, a groove 40 that is closed on the joining portion 29 side is provided to the stopper 34, and the protrusion 39 can be slid within the groove 40. As shown in

Fig. 28B, the grip component 14 is in a rotatable state, so when the stopper 34 is slid in the direction of being unlatched from the latching tab 37, the protrusion 39 hits a latching wall 41 that blocks the joining portion 29 side in the groove 40 of the stopper 34, so that the stopper 34 cannot slide any farther.

With the handle component 2 shown in Figs. 25A and 25B, the support rods 5 and the grip component 14 cannot bend when extended, so as shown in Figs. 29A and 29B, a hemispherical protrusion 43 is provided to the bottom 42 of the joining portion 29, a hemispherical recess 44 for fittably supporting the hemispherical protrusion 43 is provided to the core component 30, and when the grip component 14 and the support rods 5 have been extended, as shown in Fig. 29A, the hemispherical protrusion 43 of the joining portion 29 fits into and is fixed in the hemispherical recess 44 of the core component 30. In contrast, when the handle component 2 is to be folded up, as shown in Fig. 29B, the grip component 14 is rotated by applying a slight force to it, whereupon the hemispherical protrusion 43 of the joining portion bottom 42 comes out of the hemispherical recess 44 of the core component 30, allowing the grip component 14 to be rotated and the support rods 5 and the grip component 14 to be folded in two.

The cleaning component 1 of the cleaning tool of the present invention may also be a disposable type, in which case the cleaning component 1 can be removed from the handle

component 2 after use and replaced with a new cleaning component 1.

INDUSTRIAL APPLICABILITY

The present invention can be used to advantage in the home and elsewhere as a cleaning tool for removing dust that has built up on chests and other such furniture; computers, lighting devices, and other such electrical products; and interior walls, thresholds and sills, molding, and so forth.